

REMARKS

Claims 1-6, 8-17 and 19 are all of the claims currently pending in this application after entry of the foregoing amendments. Claim 7 is cancelled via this Amendment.

As suggested by the Examiner, Applicants amend the paragraph bridging pages 3-4 of the specification to insert the phrase --substantially triangular-- before the term “shape” in the first line thereof. Accordingly, the objection to the specification is believed to be overcome, and withdrawal thereof is respectfully requested.

The rejection of claim 7 under 35 U.S.C. §112, second paragraph, and the objection thereto under 37 C.F.R. §1.75(c), are rendered moot by the cancellation of this claim.

Claims 1, 7, 8, 10-12 and 19 are rejected under 35 U.S.C. §103(a) as being obvious over Watanabe et al.(U.S. Patent No 4,682,641 [hereinafter “Watanabe”]) in view of Verdier (U.S. Patent No. 3,457,981) and, optionally, Sipe (U.S. Patent No. 2,245,728). Claims 2-6 and 9 are rejected under 35 U.S.C. §103(a) as being obvious over Watanabe, Verdier and Sipe as above, and further in view of Clayton (U.S. Patent No. 4,237,955). Claims 13 and 14 are rejected under 35 U.S.C. §103(a) as being obvious over Watanabe, Verdier and Sipe as above, and further in view of Sato et al. (U.S. Patent No. 5,404,925 [hereinafter “Sato”]) or Roger (U.S. Patent No. 4,194,548). Claims 15 and 16 are rejected under 35 U.S.C. §103(a) as being obvious over Watanabe, Verdier and Sipe as above, and further in view of GB 1248891 and JP 4-28509 or JP 61-3711. Claim 17 is rejected under 35 U.S.C. §103(a) as being obvious over Watanabe.

The Examiner relies on Watanabe, Verdier and Sipe in rejecting numerous claims, including claim 1. Watanabe discloses carved grooves 86 that are substantially complementary to the shaping surface of the vulcanizing mold. In contrast, the carved grooves formed in the tread surface of the green tires in accordance with the present invention are not complementary to the shape of the lug groove ribs, i.e., the shapes are different (as recited in independent claims 1 and 17), and the carved grooves widen gradually in a triangular shape from the side of the tread center to the side of the tread end.

The Examiner appears to allege that Watanabe's method, in which the carved grooves are complementary to the shaping surface of the vulcanizing mold, can also eliminate interference and pressing of the lug groove ribs when the green tire is being introduced into the mold. However, Applicants respectfully submit that the Examiner is mistaken. If the carved grooves and the lug groove ribs in the mold are complementary, then no errors can be permitted in adjusting the position of the green tire relative to the lug groove ribs in the mold when the green tire is to be introduced into the mold. If any positional errors (for example, on the order of 1 to 2 mm) do occur, then the lug groove ribs will interfere with (and press into) the green tire. This is the case because the upper and lower mold halves 11 and 12 shown in Figs. 5(a) to 5(c) of this application are relatively swiveled with resultant swiveling movement between the green tire and the lug groove ribs when the mold is closed. The lug groove ribs formed in the mold halves are introduced into the carved grooves from the side of the tread end, so that the triangularly widening shape (wider at the tread end than at the tread center) of the carved grooves serves to permit the lug groove ribs to slide into the carved grooves without substantial interference and pressing

even if some positional error exists between the green tire and the mold. The triangular shape of each carved groove is somewhat greater than the shape of each lug groove rib so that clearances are left, but the clearances are eliminated by rubber flow when the vulcanization operation is carried out.

Since the primary reference to Watanabe is not pertinent, it should not be necessary to discuss the secondary references. However, if necessary, the Examiner's attention is respectfully directed to the arguments submitted on August 19, 2002, in response to the first Office Action dated May 8, 2002.

In view of the preceding amendments and remarks, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby earnestly solicited. If there are any points remaining in issue that the Examiner feels may be best resolved through a personal or telephonic interview, he is kindly requested to contact the undersigned attorney at the local telephone number listed below.

AMENDMENT UNDER 37 C.F.R. §1.116
U.S. SERIAL NO. 09/633,336

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The USPTO is directed and authorized to charge all required fees (except the Issue Fee and/or the Publication Fee) to our Deposit Account No. 19-4880. Please also credit any over-payment to said Deposit Account.

Respectfully submitted,



Steven M. Gruskin
Registration No. 36,818

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

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PATENT TRADEMARK OFFICE

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APPENDIX
VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Pages 3-4, bridging paragraph:

The carved groove may be carved in a substantially triangular shape opened from a tread center side to a tread end gradually widening. The lug groove rib enters the carved groove easily when the mold is closed and a full mold composed of upper and lower split half parts can be adopted in the vulcanization-molding machine easily. Further, volume of space at a part of the carved groove not overlapping with a lug groove formed by the lug groove rib can be made so small that the space can be filled with a rubber flowing into it easily on vulcanization-molding. Thus, wrinkles caused by the space not filled with the rubber can be restrained effectively to improve appearance of the tire.

IN THE CLAIMS:

Claim 7 is cancelled without prejudice and/or disclaimer.

Claim 1 is amended as follows:

1. (Twice Amended) A method for manufacturing a pneumatic tire in which a green tire having tire components assembled is charged in a mold for vulcanization-molding and lug grooves are formed on a tire tread surface within the mold by lug groove ribs provided on an inner surface of the mold, said method including previously forming carved grooves at positions on a tread surface of said green tire corresponding to said lug grooves such that the carved

grooves extend in substantially the same direction as said lug grooves and that each of the carved grooves has substantially a triangular shape that is different from the shape of said lug groove ribs and widens [widening] gradually from a side of a tread center to a side of a tread end, said triangular shape preventing interference and pressing of the lug groove ribs with and against the tread surface of the green tire, while ensuring smooth insertion of the lug groove ribs into the carved grooves, respectively, when the green tire is being introduced into the mold.

8. (Amended) A method for manufacturing a pneumatic tire as claimed in claim [7] 1, wherein said carved groove having the shape gradually widening is formed by carrying out the carving twice using a cutter.

17. (Twice Amended) A method for manufacturing a pneumatic tire, comprising:
a step of manufacturing a green tire in which extruded rubber having the shape of a ribbon or a sheet is piled up on a ply and a belt member assembled on a drum to form a tread;
a step of forming a carved groove on a tread surface of said green tire in direction of a lug groove; and
a step of charging said green tire formed with said carved groove in a vulcanization-molding machine to carry out vulcanization-molding so as to form a vulcanized tire having the lug groove, which is formed by a lug groove rib of the vulcanization-molding machine;
wherein the carved groove has a shape that is different from the shape of the lug groove rib.